

**FACT SHEET FOR NPDES PERMIT  
NO. WA-002062-1**

**DOUGLAS COUNTY SEWER DISTRICT #1  
EAST WENATCHEE WASTEWATER TREATMENT PLANT**

**SUMMARY**

The Douglas County Sewer District (DCSD) is seeking reissuance of its National Pollutant Discharge Elimination System (NPDES) Permit for its Publicly-Owned Treatment Works (POTW) at East Wenatchee. The POTW underwent an extensive upgrade in the late 1990's, prior to the issuance of the existing permit.

The DCSD currently encompasses approximately 5,430 acres, of which about 3,400 acres currently are served with sewers. The POTW consists of approximately 58 miles of sewers, 6 lift stations, and a wastewater treatment plant. The treatment plant provides secondary-level treatment utilizing an activated sludge process. Treated wastewater is disinfected with ultraviolet light and then is discharged through a submerged outfall to the Columbia River. The treatment plant produces Class A Biosolids, which are land-applied to wheat fields in the Boulder Park area under the Department of Ecology's statewide general permit for biosolids management.

During the existing permit cycle the POTW had difficulties controlling odors produced by its Autothermal Thermophilic Aerobic Sludge Digesters. The problem has largely been overcome with the addition of a bio-filtration system which ameliorates gases vented by the digesters.

The POTW has occasionally experienced unexplained upsets to the treatment works which have resulted in less than effective disinfection of effluent. Therefore, the proposed permit requires the submittal of an Industrial User Survey. The purpose of the Survey is to help the DCSD to discover potentially significant industrial and/or commercial users discharging to the collection system.

In 2002, the POTW accidentally discharged approximately 300,000 gallons of untreated wastewater to the Columbia River. Inadequate operating and maintenance procedures were found to be the cause. Consequently, Ecology issued a Notice of Violation on September 9, 2002 for failing to submit and operating the facility without an O&M Manual. This accidental discharge can be regarded as an exception since during the existing permit cycle, from March 2000 to the present, the treatment plant has generally discharged good-quality effluent.

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## **INTRODUCTION**

The Federal Clean Water Act (FCWA, 1972, and later modifications, 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One of the mechanisms for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System of permits (NPDES permits), which is administered by the Environmental Protection Agency (EPA). The EPA has authorized the State of Washington to administer the NPDES permit program. Chapter 90.48 RCW defines the Department of Ecology's authority and obligations in administering the wastewater discharge permit program.

The regulations adopted by the State include procedures for issuing permits (Chapter 173-220 WAC), technical criteria for discharges from municipal wastewater treatment facilities (Chapter 173-221 WAC), water quality criteria for surface and ground waters (Chapters 173-201A and 200 WAC), and sediment management standards (Chapter 173-204 WAC). These regulations require that a permit be issued before discharge of wastewater to waters of the State is allowed.

The regulations also establish the basis for effluent limitations and other requirements which are to be included in the permit. One of the requirements (WAC 173-220-060) for issuing a permit under the NPDES permit program is the preparation of a draft permit and an accompanying fact sheet. Public notice of the availability of the draft permit is required at least thirty days before the permit is issued (WAC 173-220-050). The fact sheet and draft permit are available for review (see Appendix A--Public Involvement of the fact sheet for more detail on the Public Notice procedures).

The fact sheet and draft permit have been reviewed by the Permittee. Errors and omissions identified in this review have been corrected before going to public notice. After the public comment period has closed, the Department will summarize the substantive comments and the response to each comment. The summary and response to comments will become part of the file on the permit and parties submitting comments will receive a copy of the Department's response. The fact sheet will not be revised. Comments and the resultant changes to the permit will be summarized in Appendix D--Response to Comments.

GENERAL INFORMATION	
Applicant	Douglas County Sewer District #1
Facility Name and Address	East Wenatchee Wastewater Treatment Plant 1050 Sunset Highway East Wenatchee, WA 98802
Type of Treatment:	Class III Activated Sludge
Discharge Location	Columbia River at River Mile 465.7 Latitude: 47° 25' 06" N Longitude: 120° 17' 54" W
Water Body ID Number	WA-CR-1040

## BACKGROUND INFORMATION

### DESCRIPTION OF THE FACILITY

#### History

The Douglas County Sewer District (DCSD) was organized in 1964.

The DCSD publicly-owned treatment works (POTW) is located on the east bank of the Columbia River, directly across from the City of Wenatchee and approximately 0.6 miles north of the Wenatchee - East Wenatchee Bridge. The existing sewer service area includes the City of East Wenatchee and surrounding areas of Douglas County comprising approximately 5,430 acres.

The District owns, operates, and maintains the sewers, force mains and other facilities of the collection system as well as the wastewater treatment plant.

The District's POTW was originally constructed in 1965 as a primary treatment facility. In 1972, secondary treatment was added that included two complete-mix aeration basins, a secondary clarifier and sludge handling facilities. In 1993, a new jet aeration system retrofit was made to the aeration basins with the removal of the submerged turbine aerators, in order to provide greater oxygen transfer.

In 1996 - 1999, a major upgrade occurred in two phases. The upgrades included: 1) new aerated grit chambers, 2) a new influent screening facility, 3) a new influent pumping station, 4) two modified primary clarifiers, 5) new aeration basins, 5) two new secondary clarifiers, 7) new ultraviolet disinfection and removal of the old chlorination unit, 8) new auto-heated, thermophilic, aerobic sludge digesters, 9) new sludge handling centrifuges, and 10) a renovated operations building.

### **Collection System Status**

The sanitary collection system is composed of over 58 miles of piping. In 2002 the collection system served an estimated 16,600 persons.

### **Treatment Processes**

The influent passes through one of two primary clarifiers, and then is routed to a multi-celled selector aeration basin with fine bubble diffusers. The selector basins have anoxic [low level of dissolved oxygen] zones that alternate with aerated zones. This type of wastewater treatment provides biological nitrification and de-nitrification (enhanced ammonia and nitrate removal).

The wastewater is then routed through one of two secondary clarifiers prior to ultraviolet disinfection and discharge through the outfall to the Columbia River. Sludge wasted from the aeration basins is processed in a series of three Autothermal Thermophilic Aerobic (ATAD) Sludge Digesters that produces Class A biosolids.

### **Discharge Outfall**

Secondary treated and disinfected effluent is discharged from the facility via a 24-inch diameter pipe that is reduced and connected to a 14-inch diameter outfall pipe. The 14-inch outfall is a point discharge that is located approximately 100 feet out into the Columbia River at an approximate depth of 30 feet.

### **Residual Solids**

The treatment facilities remove solids during the treatment of the wastewater at the headworks (aerated grit chambers and rotary fine screen), and at the primary and secondary clarifiers, in addition to incidental solids (rags, scum, and other debris) removed as part of the routine maintenance of the equipment. Grit, rags, scum and screenings are drained and disposed of as solid waste at the local landfill.

The wasted activated sludge processed by the aerobic digesters produce biosolids that meet the State's Class A biosolids standards.

Solids removed from the secondary clarifier are treated by the ATADs, dewatered in a centrifuge, and land applied at Boulder Park Incorporated (BPI) in accordance with King County's provisional approval under the statewide general permit for biosolids management and in accordance with the King County/BPI Site Specific Land Application Plan. Numerous alternative biosolids management options are available to the District, as the biosolids meets the state's "exceptional quality" standards."

## **PERMIT STATUS**

The existing permit for this facility was issued on January 27, 2000. The existing permit placed effluent limitations on 5-day Biochemical Oxygen Demand (BOD<sub>5</sub>), Total Suspended Solids (TSS), pH, Fecal Coliform bacteria, and Total Ammonia (as NH<sub>3</sub>-N).

An application for permit renewal was submitted to the Department on June 17, 2004 and accepted by the Department on July 22, 2004.

## **SUMMARY OF COMPLIANCE WITH THE EXISTING PERMIT**

The facility received its last inspection on November 2, 2004. A compliance inspection without sampling was conducted on May 14, 2004.

During the history of the existing permit, the Permittee has generally remained in compliance with the limits, based on Discharge Monitoring Reports (DMRs) submitted to the Department and inspections conducted by the Department. Since October 2001(a total of 36 months), the weekly maximum Fecal Coliform Bacteria limit was exceeded 6 times and the monthly maximum Fecal Coliform Bacteria limit was exceeded 3 times. The limit placed on average monthly Ammonia concentration was exceeded 3 times. The permit's maximum average monthly Total Suspended Solids (TSS) concentration limit was violated once. The TSS maximum average weekly concentration limit was violated twice.

On July 8 and 9, 2002, the sewer district discharged approximately 300,000 gallons of untreated wastewater to the Columbia River. The discharge was due to a power outage at the wastewater treatment plant and the failure of the influent lift pumps to restart after the outage. This discharge was the result of inadequate operating and maintenance procedures. Consequently, Ecology issued a Notice of Violation (DE 02WQCR-4685) on September 9, 2002 for failing to submit and operating the facility without an O&M Manual (Violation of WAC 173-240-080).

The Permittee has since submitted an O&M Manual, which was approved by the Department on September 9, 2003.

## **WASTEWATER CHARACTERIZATION**

The concentration of pollutants in the discharge was reported in the NPDES application and in DMRs.

## Influent

### Conventional Pollutant Loadings

Monthly influent characterization data are presented Table 1 in comparison to design loadings. Data reflect influent loadings reported in DMRs submitted during the period October 2001 through October 2004.

**Table 1: Characterization of Influent Loadings**

Parameter	Average	Highest Monthly Loading	Percent of Monthly Design Loading	Maximum Monthly Design Loading
Flow, in MGD	1.429	1.552	41	3.80
BOD <sub>5</sub> , in lbs/day	3176	4,277	54	7,930
TSS, in lbs/day	2,799	3,692	47	7,930

## Effluent

The concentration of pollutants in the discharge was reported in the NPDES application and DMRs submitted to the Department. In the case of pollutants limited in the existing permit, the characterization is given in the context of the permit limit.

### Conventional and Conservative Pollutants

Average monthly effluent concentrations and loadings are characterized for October 2001 through October 2004 from DMR data submitted to the Department by the City.

**Table 2: Characterization of Effluent**

Parameter	Units	Average Value	Maximal / Minimal Monthly Average	Permit Limit
Biological Oxygen Demand (five-day)	mg/L	10	19 max	30 mg/L monthly avg.
Biological Oxygen Demand (five-day)	lbs/day	117	237 max	951 lbs/day avg. monthly
Total Suspended Solids	mg/L	11	43 max	30 mg/L monthly avg.
Total Suspended Solids	lbs/day	127	355 max	951 lbs/day avg. monthly
Ammonia	mg/L	6.0	30 max	17 mg/L monthly



Parameter	Units	Average Value	Maximal / Minimal Monthly Average	Permit Limit
				avg.
Ammonia	lbs/day	73	374 max	539 lbs/day avg. monthly
Minimum pH	standard units	6.7	6.1 min	not less than 6.0
Maximum pH	standard units	7.2	8.2 max	not greater than 9.0
Dissolved Oxygen	mg/L	1.2	0.8 min	NA
Temperature	Degrees F	68	78 max	NA
Hardness	as CaCO <sub>3</sub>	105	73 min; 178 max	NA
Alkalinity	as CaCO <sub>3</sub>	116	81 min; 210 max	NA
Fecal Coliform Bacteria	#colonies/100 mL	54	504 max	200 avg. monthly

### Priority Pollutants

The DCSD conducted two priority pollutant analyses on its treated effluent, fulfilling the requirements of the existing permit's S8. Additional Chemical Analysis of Effluent (aluminum, iron, and lead concentrations analyzed once). The results which produced detectable concentrations of the Metals and Fats Oils Grease (FOG) testing are presented below in Table 3. The analysis of Metals, Total Phenols, and Volatile and Semi-volatile Organics parameters which resulted in non-detects are reported in Appendix D.

**Table 3: Effluent Characterization for Priority Pollutants**

Metals, Cyanide, FOG (Fats, Oil, and Grease), Total Phenols				
Priority Pollutant Parameter	Units	Average Value	Number of Samples	Number of Detects
Aluminum	µg/L	57.9	1	1
Iron	µg/L	55.8	1	1
Copper	µg/L	16.8	2	2
Lead	µg/L	1.0	1	1
Zinc	µg/L	58.3	2	2
Hexane Extractable FOG	mg/L	3.45	2	2
Cyanide	µg/L	25.5	2	2

## **SEPA COMPLIANCE**

A SEPA Environmental Checklist was prepared in conjunction with the draft Douglas County Sewer District General Sewer Plan (March 2004). The lead agency is the Douglas County Sewer District No.1. A Determination of Nonsignificance was made December 30, 2003.

## **PROPOSED PERMIT LIMITATIONS**

Federal and State regulations require that effluent limitations set forth in a NPDES permit must be either technology- or water quality-based. Technology-based limitations for municipal discharges are set by regulation (40 CFR 133, and Chapters 173-220 and 173-221 WAC). Water quality-based limitations are based upon compliance with the Surface Water Quality Standards (Chapter 173-201A WAC), Ground Water Standards (Chapter 173-200 WAC), Sediment Quality Standards (Chapter 173-204 WAC) or the National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992.) The most stringent of these types of limits must be chosen for each of the parameters of concern. Each of these types of limits is described in more detail below.

The limits in this permit are based in part on information received in the application. The effluent constituents in the application were evaluated on a technology- and water quality-basis.

The limits necessary to meet the rules and regulations of the State of Washington were determined and included in this permit. Ecology does not develop effluent limits for all pollutants that may be reported on the application as present in the effluent. Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and do not have a reasonable potential to cause a water quality violation. Effluent limits are not always developed for pollutants that may be in the discharge but not reported as present in the application. In those circumstances the permit does not authorize discharge of the non-reported pollutants. Effluent discharge conditions may change from the conditions reported in the permit application. If significant changes occur in any constituent, as described in 40 CFR 122.42(a), the Permittee is required to notify the Department of Ecology. The Permittee may be in violation of the permit until the permit is modified to reflect additional discharge of pollutants.

## **DESIGN CRITERIA**

In accordance with WAC 173-220-150 (1)(g), flows or waste loadings shall not exceed approved design criteria.

The design criteria for this treatment facility are taken from the 1995 Engineering Report prepared by Gray & Osborne Consulting Engineers and are as follows:

**Table 4: Design Standards for Douglas County Sewer District No.1 WWTP**

Parameter	Design Quantity
Monthly average flow (max. month)	3.8 MGD
Peak Hour Flow	7.6 MGD
BOD <sub>5</sub> influent loading	7,930 lbs/day
TSS influent loading	7,930 lbs/day
COD influent loading	13,500 lbs/day
TKN influent loading	1,110 lbs/day
Design population equivalent	37,450 persons

## TECHNOLOGY-BASED EFFLUENT LIMITATIONS

Municipal wastewater treatment plants are a category of discharger for which technology-based effluent limits have been promulgated by Federal and State regulations. These effluent limitations are given in the Code of Federal Regulations (CFR) 40 CFR Part 133 (Federal) and in Chapter 173-221 WAC (State). These regulations are performance standards that constitute all known available and reasonable methods of prevention, control, and treatment (AKART) for municipal wastewater.

The following technology-based limits for pH, fecal coliform, BOD<sub>5</sub>, and TSS are taken from Chapter 173-221 WAC:

**Table 5: Technology-based Limits**

Parameter	Limit
pH:	shall be within the range of 6 to 9 standard units.
Fecal Coliform Bacteria	Monthly Geometric Mean = 200 organisms/100 mL Weekly Geometric Mean = 400 organisms/100 mL
BOD <sub>5</sub> (concentration)	Average Monthly Limit is the most stringent of the following: - 30 mg/L - may not exceed fifteen percent (15%) of the average influent concentration Average Weekly Limit = 45 mg/L
TSS (concentration)	Average Monthly Limit is the most stringent of the following: - 30 mg/L - may not exceed fifteen percent (15%) of the average influent concentration Average Weekly Limit = 45 mg/L

The following technology-based mass limits are based on WAC 173-220-130(3)(b) and 173-221-030(11)(b).

Monthly effluent mass loadings (lbs/day) were calculated as the maximum monthly design flow (3.8 MGD) x Concentration limit (30 mg/L) x 8.34 (conversion factor) = 951 lbs/day.

The weekly average effluent mass loading is calculated as 1.5 x monthly loading = 1,427 lbs/day.

## PERFORMANCE-BASED EFFLUENT LIMITATIONS

The existing permit includes a technology-based ammonia limit of 17 mg/L. This limit was established from design criteria in the 1995 Engineering Report. The only rationale or explanation for the limit given in the Engineering Report's design criteria summary states that the "ammonia limits are based on the analysis of historical river characteristics". No data or calculations supporting this assertion are given in the Engineering Report.

At the time the existing permit was written, the treatment plant had recently undergone a significant upgrade. Therefore, use of the Engineering Report's tech-based limit was justified because there was no record of nitrification performance.

The proposed permit will adopt an average monthly ammonia limit of 16 mg/L as a performance based limit. This value is based on the 95<sup>th</sup> percentile reported ammonia concentrations in the effluent from March 2000 through October 2004. This concentration of ammonia has no reasonable potential to exceed water quality criteria at the edge of the chronic mixing zone according to the Department's calculations presented in Appendix C. The permit also establishes an average weekly ammonia concentration limit of 24 mg/L.

The proposed permit will not include mass loading limits for ammonia. This is justified in the following federal regulation, 40 CFR 122:

122.45 Calculating NPDES permit conditions (applicable to State NPDES programs, see § 123.25)

(f) *Mass limitations.* (1) All pollutants limited in permits shall have limitations, standards or prohibitions expressed in terms of mass except: ....(ii) When applicable standards and limitations are expressed in terms of other units of measurement;

WAC 173-201A-040 establishes ammonia criteria in effluent discharged to water's of the State in units of concentration; the proposed permit does not include mass limits for this toxic substance. The concentration based limits for ammonia in the permit will be protective of the receiving water. However, S2. of the permit requires the Permittee to continue reporting ammonia loadings to the river.

## **SURFACE WATER QUALITY-BASED EFFLUENT LIMITATIONS**

In order to protect existing water quality and preserve the designated beneficial uses of Washington's surface waters, WAC 173-201A-060 states that waste discharge permits shall be conditioned such that the discharge will meet established Surface Water Quality Standards. The Washington State Surface Water Quality Standards (Chapter 173-201A WAC) is a State regulation designed to protect the beneficial uses of the surface waters of the State. Water quality-based effluent limitations may be based on an individual waste load allocation (WLA) or on a WLA developed during a basin-wide total maximum daily loading study (TMDL).

### **Numerical Criteria for the Protection of Aquatic Life**

"Numerical" water quality criteria are numerical values set forth in the State of Washington's Water Quality Standards for Surface Waters (Chapter 173-201A WAC). They specify the levels of pollutants allowed in a receiving water while remaining protective of aquatic life. Numerical criteria set forth in the Water Quality Standards are used along with chemical and physical data for the wastewater and receiving water to derive the effluent limits in the discharge permit.

When surface water quality-based limits are more stringent or potentially more stringent than technology-based limitations, they must be used in a permit.

### **Numerical Criteria for the Protection of Human Health**

The State was issued 91 numeric water quality criteria for the protection of human health by the U.S. EPA (EPA 1992). These criteria are designed to protect humans from cancer and other disease and are primarily applicable to fish and shellfish consumption and drinking water from surface waters.

### **Narrative Criteria**

In addition to numerical criteria, "narrative" water quality criteria (WAC 173-201A-030) limit toxic, radioactive, or deleterious material concentrations below those which have the potential to adversely affect characteristic water uses, cause acute or chronic toxicity to biota, impair aesthetic values, or adversely affect human health. Narrative criteria protect the specific beneficial uses of all fresh (WAC 173-201A-130) and marine (WAC 173-201A-140) waters in the State of Washington.

### **Antidegradation**

The State of Washington's Antidegradation Policy requires that discharges into a receiving water shall not further degrade the existing water quality of the water body. In cases where the natural conditions of a receiving water are of lower quality than the criteria assigned, the natural conditions shall constitute the water quality criteria. Similarly, when receiving waters are of higher quality than the criteria assigned, the existing water quality shall be protected. More information on the State Antidegradation Policy can be obtained by referring to WAC 173-201A-070.

The Department has reviewed existing records and is unable to determine if ambient water quality is either higher or lower than the designated classification criteria given in Chapter 173-201A WAC; therefore, the Department will use the designated classification criteria for this water body in this permit. The discharges authorized by this permit should not cause a loss of beneficial uses.

### **Critical Conditions**

Surface water quality-based limits are derived for the waterbody's critical condition, which represents the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota, human health, and existing or characteristic water body uses.

### **Mixing Zones**

The Water Quality Standards allow the Department of Ecology to authorize mixing zones around a point of discharge in establishing surface water quality-based effluent limits. Both "acute" and "chronic" mixing zones may be authorized for pollutants that can have a toxic effect on the aquatic environment near the point of discharge. The concentration of pollutants at the boundary of these mixing zones may not exceed the numerical criteria for that type of zone. Mixing zones can only be authorized for discharges that are receiving AKART and in accordance with other mixing zone requirements of WAC 173-201A-100.

The National Toxics Rule (EPA, 1992) allows the chronic mixing zone to be used to meet human health criteria.

### **Description of the Receiving Water**

The facility discharges to the Columbia River, which is designated as a Class A receiving water in the vicinity of the outfall. Other nearby point source outfalls include the City of Wenatchee POTW, which discharges to the Columbia from the opposite river bank and about half a mile upstream. Characteristic uses include the following:

water supply (domestic, industrial, agricultural); stock watering; fish migration; fish rearing, spawning and harvesting; wildlife habitat; primary contact recreation; sport fishing; boating and aesthetic enjoyment; commerce and navigation.

Water quality of this class shall meet or exceed the requirements for all or substantially all uses.

### Surface Water Quality Criteria

Applicable criteria are defined in Chapter 173-201A WAC for aquatic biota. In addition, U.S. EPA has promulgated human health criteria for toxic pollutants (EPA 1992). Criteria for this discharge are summarized below:

**Table 6: Applicable Water Quality Criteria**

Parameter	Criteria
Fecal Coliforms	100 organisms/100 mL maximum geometric mean
Dissolved Oxygen	8 mg/L minimum
Temperature	18 degrees Celsius maximum or incremental increases above background
pH	6.5 to 8.5 standard units
Turbidity	less than 5 NTUs above background
Toxics	No toxics in toxic amounts (see Appendix C for numeric criteria for toxics of concern for this discharge)

### Consideration of Surface Water Quality-Based Limits for Numeric Criteria

Pollutant concentrations in the proposed discharge exceed water quality criteria with technology-based controls which the Department has determined to be AKART. Mixing zones are authorized in accordance with the geometric configuration, flow restriction, and other restrictions for mixing zones in Chapter 173-201A WAC and are defined as follows:

The dilution factors of effluent to receiving water that occur within these zones have been determined at the critical condition by the use of Cormix modeling. CORMIX stands for CORnell MIXing zone model, and this model has been approved by the EPA. This modeling was conducted by Gray & Osborne, Inc. for DCSD in conjunction with preparation of the January 1995 Wastewater Treatment Facilities Engineering Report.

The 1995 Engineering Report utilized a critical low flow (7Q10) of 22,500 cubic feet per second (cfs) for its CORMIX modeling and this flow rate was utilized to determine the dilution factors for the existing permit issued in January 2000. Although the 22,500 cfs flow rate is significantly less than the value utilized by other dischargers to the Columbia River in the same general region, the use of this flow value in the proposed permit will serve to minimize the authorized

dilution factors. The dilution factors developed from this flow rate are adequate to protect the aquatic environment at the edge of the acute and chronic mixing zones. It is also adequate to protect human health at the edge of the chronic mixing zone. The need for a revision in this 7Q10 flow rate will be re-evaluated at the time of the next permit issuance.

The dilution factors for the proposed permit will retain those in the existing permit. They have been determined to be:

**Table 7: Dilution Factors**

Mixing Zone Type	Acute	Chronic
Aquatic Life	18.4	135
Human Health, Carcinogen		135
Human Health, Non-carcinogen		135

Pollutants in an effluent may affect the aquatic environment near the point of discharge (near field) or at a considerable distance from the point of discharge (far field). Toxic pollutants, for example, are near-field pollutants--their adverse effects diminish rapidly with mixing in the receiving water. Conversely, a pollutant such as BOD is a far-field pollutant whose adverse effect occurs away from the discharge even after dilution has occurred. Thus, the method of calculating water quality-based effluent limits varies with the point at which the pollutant has its maximum effect.

The derivation of water quality-based limits also takes into account the variability of the pollutant concentrations in both the effluent and the receiving water.

The critical condition for the Columbia River is the seven day average low river flow with a recurrence interval of ten years (7Q10). Ambient data at critical conditions in the vicinity of the outfall was taken from the Effluent Mixing Zone Analysis conducted by Gray & Osborne for DCSD's Wastewater Treatment Facilities Engineering Report. The ambient background data used for this permit includes the data from sampling conducted by the United States Geological Service at Vernita Bridge on the Columbia River.

**Table 8: Ambient Data Used in Reasonable Potential Analysis**

Parameter	Value used
7Q10 low flow	22,500 cfs
Velocity	0.938 ft/sec
Depth	30 feet
Width	800 feet
Roughness (Manning)	n=0.035
Temperature	19° C
Fecal Coliforms	2 colonies /ml (geomean)
pH (high)	8.0



Parameter	Value used
Dissolved Oxygen	8.5 mg/L
Total Ammonia-N	40 µg/L
Hardness	65 mg/L as CaCO <sub>3</sub>
Lead	0.17 ug/L <sup>a</sup>
Iron	1.0 ug/L <sup>a</sup>
Copper	2.0 ug/L
Zinc	4.0 ug/L
Aluminum	28 ug/L
<sup>a</sup> Ambient concentration reported as less than the quantification level, entered at quantification level for purposes of conservative reasonable potential analysis.	

BOD<sub>5</sub>--Under critical conditions there is no predicted violation of the Water Quality Standards for Surface Waters. Therefore, the technology-based effluent limitation for BOD<sub>5</sub> was placed in the permit.

The impact of BOD on the receiving water was modeled employing Streeter-Phelps calculations (1995 DCSD Facilities Engineering Report), at critical condition and with the technology-based effluent limitation for BOD<sub>5</sub> described under "Technology-Based Effluent Limitations" above.

Temperature--The impact of the discharge on the temperature of the receiving water was modeled by simple mixing analysis at critical condition. The receiving water temperature at the critical condition is 19° C and the effluent temperature is 25° C. The predicted resultant temperature at the boundary of the chronic mixing zone is 19.003° C and therefore the incremental rise is 0.003° C. This is much less than the threshold for human induced temperature raise (0.3° C) to the receiving water given by WAC 201A-030. Therefore the Permittee will not have a temperature limit in the proposed permit.

pH--The impact of pH was modeled using the calculations from EPA, 1988. The input variables were dilution factor 135, upstream temperature 19° C, upstream pH 8.0, upstream alkalinity 65 (as mg CaCO<sub>3</sub>/L), effluent temperature 25° C, effluent pH of 7.6, and effluent alkalinity 163 (as mg CaCO<sub>3</sub>/L). Under critical conditions there is no predicted violation of the Water Quality Standards for Surface Waters. Therefore, a technology-based effluent limitation for pH was placed in the permit.

Fecal coliform--The numbers of fecal coliform were modeled by simple mixing analysis using the technology-based limit of 400 organisms per 100 ml and a dilution factor of 135. Under critical conditions there is no predicted violation of the Water Quality Standards for Surface Waters with the technology-based limit. Therefore, the technology-based effluent limitation for fecal coliform bacteria was placed in this permit.

Toxic Pollutants--Federal regulations (40 CFR 122.44) require NPDES permits to contain effluent limits for toxic chemicals in an effluent whenever there is a reasonable potential for

those chemicals to exceed the surface water quality criteria. This process occurs concurrently with the derivation of technology-based effluent limits. Facilities with technology-based effluent limits defined in regulation are not exempted from meeting the Water Quality Standards for Surface Waters or from having surface water quality-based effluent limits.

The following toxics were determined to be present in the discharge: cyanide, ammonia, and metals (zinc, copper, lead, iron, aluminum). A reasonable potential analysis (See Appendix C) was conducted on these parameters to determine whether or not effluent limitations would be required in this permit.

The determination of the reasonable potential for cyanide, ammonia, and metals (zinc, copper, lead, iron, aluminum) to exceed the water quality criteria was evaluated with procedures given in EPA, 1991 (Appendix C) at the critical condition. The critical condition in this case occurs in August of each year. The parameters used in the critical condition modeling are as follows: acute dilution factor 18, chronic dilution factor 135, receiving water temperature 19° C, receiving water alkalinity 65 (as mg CaCO<sub>3</sub>/L), cyanide, ammonia, and metals (zinc, copper, lead, iron, aluminum).

Valid ambient background data were available for cyanide, ammonia, and metals (zinc, copper, lead, iron, aluminum). Calculations using all applicable data resulted in a determination that there is no reasonable potential for this discharge to cause a violation of water quality standards. This determination assumes that the Permittee meets the other effluent limits of this permit.

### **Whole Effluent Toxicity**

The Water Quality Standards for Surface Waters require that the effluent not cause toxic effects in the receiving waters. Many toxic pollutants cannot be detected by commonly available detection methods. However, toxicity can be measured directly by exposing living organisms to the wastewater in laboratory tests and measuring the response of the organisms. Toxicity tests measure the aggregate toxicity of the whole effluent, and therefore this approach is called whole effluent toxicity (WET) testing.

Toxicity caused by unidentified pollutants is not expected in the effluent from this discharge as determined by the screening criteria given in Chapter 173-205 WAC. Therefore, no whole effluent toxicity testing is required in this permit. The Department may require effluent toxicity testing in the future if it receives information that toxicity may be present in this effluent.

### **Human Health**

Washington's water quality standards now include 91 numeric health-based criteria that must be considered in NPDES permits. These criteria were promulgated for the State by the U.S. EPA in its National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992).

The Department has determined that the effluent contains the following chemicals of concern for human health: 1) iron, and 2) cyanide. The discharger's high priority status is based on knowledge of data or process information indicating regulated chemicals occur in the discharge.

A determination of the discharge's potential to cause an exceedance of the water quality standards was conducted as required by 40 CFR 122.44(d). The reasonable potential determination was evaluated with procedures given in the Technical Support Document for Water Quality-Based Toxics Control (EPA/505/2-90-001) and the Department's Permit Writer's Manual (Ecology Publication 92-109, July, 1994). The determination indicated that the discharge has no reasonable potential to cause a violation of water quality standards, thus effluent limits iron and cyanide are not warranted (see Appendix C - Reasonable Potential for Protection of Human Health spreadsheet for the details).

### **Sediment Quality**

The Department has promulgated aquatic sediment standards (Chapter 173-204 WAC) to protect aquatic biota and human health. These standards state that the Department may require Permittees to evaluate the potential for the discharge to cause a violation of applicable standards (WAC 173-204-400).

The Department has determined through a review of the discharger characteristics and effluent characteristics that this discharge has no reasonable potential to violate the Sediment Management Standards.

### **GROUND WATER QUALITY LIMITATIONS**

The Department has promulgated Ground Water Quality Standards (Chapter 173-200 WAC) to protect uses of ground water. Permits issued by the Department shall be conditioned in such a manner so as not to allow violations of those standards (WAC 173-200-100).

This Permittee has no discharge to ground and therefore no limitations are required based on potential effects to ground water.

## COMPARISON OF EFFLUENT LIMITS WITH THE EXISTING PERMIT ISSUED JANUARY 27, 2000

**Table 9: Existing and Proposed Permit Limits**

Parameter	Existing Permit Limits		Proposed Permit Limits	
	Monthly Average	Weekly Average	Monthly Average	Weekly Average
BOD	30 mg/L 85 % removal 951 lbs/day	45 mg/L 1,427 lbs/day	30 mg/L 85 % removal 951 lbs/day	45 mg/L 1,427 lbs/day
TSS	30 mg/L 85 % removal 951 lbs/day	45 mg/L 1,427 lbs/day	30 mg/L 85 % removal 951 lbs/day	45 mg/L 1,427 lbs/day
Total Ammonia (as NH <sub>3</sub> -N)	17 mg/L 539 lbs/day	25.5 mg/L 808 lbs/day	16 mg/L	24 mg/L
Fecal Coliform	200/100 mL	400/100 mL	200/100 mL	400/100 mL
pH	6 to 9 standard units		6 to 9 standard units	

## MONITORING REQUIREMENTS

Monitoring, recording, and reporting are required (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and the effluent limitations are being achieved.

The monitoring schedule is detailed in the proposed permit under Special Condition S2. Specified monitoring frequencies take into account the quantity and variability of discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring. The required monitoring frequency is consistent with agency guidance given in the current version of Ecology's *Permit Writer's Manual* (July 2002) for an activated sludge plant with design flow greater than 2.0 MGD.

Additional monitoring is required in order to further characterize the effluent. These monitored pollutants could have a significant impact on the quality of the surface water.

## LAB ACCREDITATION

With the exception of certain parameters the permit requires all monitoring data to be prepared by a laboratory registered or accredited under the provisions of Chapter 173-50 WAC, *Accreditation of Environmental Laboratories*. The laboratory at this facility is accredited for the parameters given in the table below:

**Table 10: Accredited Parameters**

<b>General Chemistry</b>			
<b>Parameter name</b>	<b>Method</b>	<b>Reference</b>	<b>Matrix<sup>a</sup></b>
Alkalinity, Total	2320 B(4a)	SM <sup>b</sup>	N
Ammonia	4500-NH3 F	SM 18	N
Biochemical Oxygen Demand, BOD/CBOD	5210 B	SM	N
Hardness, Total (as CaCO3)	8226	Hach	N
pH	4500-H	SM	N
Solids, Total Suspended	2540 D	SM	N
<b>Microbiology</b>			
<b>Parameter name</b>	<b>Method</b>	<b>Reference</b>	<b>Matrix</b>
Fecal Coliform - count	9222 D	SM	N
<sup>a</sup> Matrix key: N = non-potable water			
<sup>b</sup> SM = Standard Methods for the Examination of Water and Wastewater			

## **OTHER PERMIT CONDITIONS**

### **REPORTING AND RECORDKEEPING**

The provisions of Special Condition S3. are based on the authority to specify any appropriate reporting and recordkeeping requirements to prevent and control waste discharges (WAC 173-220-210).

### **PREVENTION OF FACILITY OVERLOADING**

Overloading of the treatment plant is a violation of the terms and conditions of the permit. To prevent this from occurring, RCW 90.48.110 and WAC 173-220-150 require the Permittee to take the actions detailed in Special Condition S4.B to plan expansions or modifications before existing capacity is reached and to report and correct conditions that could result in new or increased discharges of pollutants. Special Condition S4.A restricts the amount of flow.

### **OPERATION AND MAINTENANCE (O&M)**

This permit contains Special Condition S5. as authorized under RCW 90.48.110, WAC 173-220-150, Chapter 173-230 WAC, and WAC 173-240-080. It is included to ensure proper operation and regular maintenance of equipment, and to ensure that adequate safeguards are taken so that constructed facilities are used to their optimum potential in terms of pollutant capture and

treatment. An O&M Manual for this facility was approved by the Department on September 9, 2003.

## **RESIDUAL SOLIDS HANDLING**

To prevent water quality problems the Permittee is required in Special Condition S7. to store and handle all residual solids (grit, screenings, scum, sludge, and other solid waste) in accordance with the requirements of RCW 90.48.080 and State Water Quality Standards.

The final use and disposal of sewage sludge from this facility is regulated by U.S. EPA under 40 CFR 503, and by Ecology under Chapter 173-308 WAC, "Biosolids Management". The disposal of other solid waste is under the jurisdiction of the Chelan-Douglas County Health District.

The following was excerpted from the Douglas County government web-site:

Pursuant to RCW 70.95.160 local health districts "...shall adopt regulations or ordinances governing solid waste handling implementing the comprehensive solid waste management plan covering storage, collection, transportation, treatment, utilization, processing and final disposal including but not limited to the issuance of permits and the establishment of minimum levels and types of service for any aspect of solid waste handling." These activities are permitted, overseen and enforced locally through the CDHD's [*Chelan-Douglas County Health District*] Sanitation Code. The locally adopted Sanitation Code " shall assure that solid waste storage and disposal facilities are located, maintained and operated in a manner so as to properly protect the public health, prevent air and water pollution, are consistent with the priorities established in RCW 70.95. 010, and avoid the creation of nuisances."

## **PRETREATMENT**

During the existing permit cycle, the POTW has experienced occasional upsets to its wastewater treatment system that suggest detrimental discharges of pollutants into the collection system may have occurred. Therefore, the permit requires an industrial user survey to be conducted. The survey is required to determine the existence of significant industrial and/or commercial users of the sanitary sewer and wastewater treatment facility. Compliance with Federal pretreatment regulations (40 CFR Part 403 and Sections 307(b) and 308 of the Clean Water Act), with State regulations (Chapter 90.48 RCW and Chapter 173-216 WAC), and with local ordinances can then determined.

### **Federal and State Pretreatment Program Requirements**

Under the terms of the addendum to the "Memorandum of Understanding between Washington Department of Ecology and the United States Environmental Protection Agency, Region 10" (1986), the Department of Ecology (Department) has been delegated authority to administer the

Pretreatment Program (i.e. act as the Approval Authority for oversight of delegated Publicly Owned Treatment Works (POTWs)). Under this delegation of authority, the Department has exercised the option of issuing wastewater discharge permits for significant industrial users discharging to POTWs which have not been delegated authority to issue wastewater discharge permits.

There are a number of functions required by the Pretreatment Program which the Department is delegating to such POTWs because they are in a better position to implement the requirements (e.g. tracking the number and general nature of industrial dischargers to the sewerage system).

The requirements for a Pretreatment Program are contained in Title 40, part 403 of the Code of Federal Regulations. Under the requirements of the Pretreatment Program (40 CFR 403.8(f)(1)(iii)), the Department is required to approve, condition, or deny new discharges or a significant increase in the discharge for existing significant industrial users (SIUs) (40 CFR 403.8 (f)(1)(i)).

The Department is responsible for issuing State Waste Discharge Permits to SIUs and other industrial users of the Permittee's sewer system. Industrial dischargers must obtain these permits from the Department prior to the Permittee accepting the discharge (WAC 173-216-040). Industrial dischargers need to apply for a State Waste Discharge Permit sixty days prior to commencing discharge. The conditions contained in the permits will include any applicable conditions for categorical discharges, loading limitations included in contracts with the POTW, and other conditions necessary to assure compliance with State water quality standards and biosolids standards. Industries discharging wastewater that is similar in character to domestic wastewater are not required to obtain a permit.

The Department requires this POTW to fulfill some of the functions required for the Pretreatment Program in the NPDES permit (e.g. tracking the number and general nature of industrial dischargers to the sewage system). The POTW's NPDES permit will require that all SIUs currently discharging to the POTW be identified and notified of the requirement to apply for a wastewater discharge permit from the Department. None of the obligations imposed on the POTW relieve an industrial or commercial discharger of its primary responsibility for obtaining a wastewater discharge permit (if required), including submittal of engineering reports prior to construction or modification of facilities (40 CFR 403.12(j) and WAC 173-216-070 and WAC 173-240-110, et seq.).

### **Wastewater Permit Required**

RCW 90.48 and WAC 173-216-040 require significant commercial and industrial dischargers to obtain a permit prior to discharge of industrial waste to the Permittee's sewerage system. This provision prohibits the POTW from accepting industrial wastewater from any such dischargers without authorization from the Department.

### **Requirements for Routine Identification and Reporting of Industrial Users**

The NPDES permit (S6.C) requires non-delegated POTWs to "take continuous, routine measures to identify all existing, new, and proposed SIUs and potential significant commercial users, industrial users, or public entities (PSIUs) discharging to the Permittee's sewerage system". Examples of such routine measures include regular review of business tax licenses for existing businesses and review of water billing records and existing connection authorization records. System maintenance personnel can also be diligent during performance of their jobs in identifying and reporting as-yet unidentified industrial dischargers. Local newspapers, telephone directories, and word-of-mouth can also be important sources of information regarding new or existing discharges. The POTW is required to notify industrial dischargers, in writing, of their responsibilities regarding application for a State waste discharge permit and to send a copy of the written notification to the Department. The Department will then take steps to solicit a State waste discharge permit application.

### **Requirements for Performing an Industrial User Survey**

This POTW has the potential to serve significant industrial or commercial users and is required to perform an Industrial User Survey. The goal of this survey is to develop a list of SIUs and PSIUs, and of equal importance, to provide sufficient information about industries which discharge to the POTW, to determine which of them require issuance of State waste discharge permits or other regulatory controls. An Industrial User Survey is an important part of the regulatory process used to prevent interference with treatment processes at the POTW and to prevent the exceedance of water quality standards. The Industrial User Survey also can be used to contribute to the maintenance of sludge quality, so that sludge can be a useful biosolids product rather than an expensive waste problem. An Industrial User Survey is a rigorous method for identifying existing, new, and proposed significant industrial users and potential significant industrial users. A complete listing of methodologies is available in the Department of Ecology guidance document entitled "Performing an Industrial User Survey".

Some examples of commercial users, industrial users, or public entities (PSIUs) that may cause problems with the POTW may include, but are not limited to:

- dry cleaners (chemicals),
- car washes (detergents, oil & grease, grit),
- cold storage or fruit packing (ammonia refrigerants, or pesticide residue from wash),
- schools (cleaning agents, cafeteria grease),
- restaurants (grease),
- auto repair shops (oil, grease, antifreeze, and solvents), and
- supermarkets (ammonia refrigerants, BOD and grease from butcher or deli).



### **Duty to Enforce Discharge Prohibitions**

WAC 173-216-060 prohibits the POTW from authorizing or permitting an industrial discharger to discharge certain types of waste into the sanitary sewer. WAC 173-216-060(2.b.i) prohibits acceptance of pollutants which cause pass through or interference. The definitions of pass through and interference are in Appendix B of the fact sheet.

The second portion of this provision prohibits the POTW from accepting certain specific types of wastes, namely those which are explosive, flammable, excessively acidic, basic, otherwise corrosive, or obstructive to the system. In addition wastes with excessive BOD, petroleum based oils, or which results in toxic gases are prohibited to be discharged. The regulatory basis for these prohibitions is 40 CFR Part 403, with the exception of the pH provisions which are based on WAC 173-216-060.

The third portion of this provision prohibits certain types of discharges unless the POTW receives prior authorization from the Department. The discharges include cooling water in significant volumes, stormwater and other direct inflow sources, and wastewaters significantly affecting system hydraulic loading, which do not require treatment.

The permit requires the submittal to the Department of a Sewer-Use Ordinance (S6.F) for review. The ordinance is required to incorporate all of the provisions given in the permit's Special Condition S.6.E - Duty to Enforce Discharge Prohibitions.

### **INFILTRATION AND INFLOW ANALYSIS**

One year prior to the expiration of the proposed permit, the permit requires the submittal of an infiltration and inflow study. This analysis is a requirement in the proposed permit's Special Condition 4.E.

### **ADDITIONAL CHEMICAL ANALYSIS OF EFFLUENT**

The permit requires the submittal of three chemical analyses of effluent (Special Condition 8), one each in 2007 and 2008, as well as one year prior to the expiration of the proposed permit. The analyses are required by the EPA Form 2A.12 NPDES application for permit renewal. The Permittee is required to analyze composited effluent samples for concentrations of the priority pollutants given in Tables II and III of Appendix D of 40 CFR Part 122, as amended. Each composited sample is also required to be analyzed for any other pollutants expected from non-domestic sources.

### **OUTFALL EVALUATION**

Special Condition S9. requires the Permittee to conduct an outfall inspection and submit a report detailing the findings of that inspection. The purpose of the inspection is to determine the

condition of the discharge pipe and diffusers and to determine if sediment is accumulating in the vicinity of the outfall.

## **GENERAL CONDITIONS**

General Conditions are based directly on State and Federal law and regulations and have been standardized for all individual municipal NPDES permits issued by the Department.

## **PERMIT ISSUANCE PROCEDURES**

### **PERMIT MODIFICATIONS**

The Department may modify this permit to impose numerical limitations, if necessary to meet Water Quality Standards, Sediment Quality Standards, or Ground Water Standards, based on new information obtained from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

The Department may also modify this permit as a result of new or amended State or Federal regulations.

### **RECOMMENDATION FOR PERMIT ISSUANCE**

This proposed permit meets all statutory requirements for authorizing a wastewater discharge, including those limitations and conditions believed necessary to protect human health, aquatic life, and the beneficial uses of waters of the State of Washington. The Department proposes that this permit be issued for 5 years.

## **REFERENCES FOR TEXT AND APPENDICES**

Environmental Protection Agency (EPA)

1992. National Toxics Rule. Federal Register, V. 57, No. 246, Tuesday, December 22, 1992.

1991. Technical Support Document for Water Quality-based Toxics Control. EPA/505/2-90-001.

1988. Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling. USEPA Office of Water, Washington, D.C.

1985. Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water. EPA/600/6-85/002a.

1983. Water Quality Standards Handbook. USEPA Office of Water, Washington, D.C.

Gray & Osborne, Inc.

1995. Douglas County Sewer District Wastewater Treatment Facilities Engineering Report.

Metcalf and Eddy.

1991. Wastewater Engineering, Treatment, Disposal, and Reuse. Third Edition.

Tsivoglou, E.C., and J.R. Wallace.

1972. Characterization of Stream Reaeration Capacity. EPA-R3-72-012. (Cited in EPA 1985 op.cit.)

Washington State Department of Ecology.

Laws and Regulations( <http://www.ecy.wa.gov/laws-rules/index.html> )

Permit and Wastewater Related Information  
(<http://www.ecy.wa.gov/programs/wq/wastewater/index.html>)

Washington State Department of Ecology.

1994. Permit Writer's Manual. Publication Number 92-109

Water Pollution Control Federation.

1976. Chlorination of Wastewater.

Wright, R.M., and A.J. McDonnell.

1979. In-stream Deoxygenation Rate Prediction. Journal Environmental Engineering Division, ASCE. 105(E2). (Cited in EPA 1985 op.cit.)

## **APPENDIX A -- PUBLIC INVOLVEMENT INFORMATION**

The Department has tentatively determined to reissue a permit to the applicant listed on page 1 of this fact sheet. The permit contains conditions and effluent limitations which are described in the rest of this fact sheet.

Public notice of application was published on July 15, 2004 in the Wenatchee World to inform the public that an application had been submitted and to invite comment on the reissuance of this permit.

The Department will publish a Public Notice of Draft (PNOD) on March 23, 2005 in the Wenatchee World to inform the public that a draft permit and fact sheet are available for review. Interested persons are invited to submit written comments regarding the draft permit. The draft permit, fact sheet, and related documents are available for inspection and copying between the hours of 8:00 a.m. and 5:00 p.m. weekdays, by appointment, at the regional office listed below. Written comments should be mailed to:

Water Quality Permit Coordinator  
Department of Ecology  
Central Regional Office  
15 West Yakima Avenue, Suite 200  
Yakima, WA 98902

Any interested party may comment on the draft permit or request a public hearing on this draft permit within the 30 day comment period to the address above. The request for a hearing shall indicate the interest of the party and the reasons why the hearing is warranted. The Department will hold a hearing if it determines there is a significant public interest in the draft permit (WAC 173-220-090). Public notice regarding any hearing will be circulated at least 30 days in advance of the hearing. People expressing an interest in this permit will be mailed an individual notice of hearing (WAC 173-220-100).

Comments should reference specific text followed by proposed modification or concern when possible. Comments may address technical issues, accuracy and completeness of information, the scope of the facility's proposed coverage, adequacy of environmental protection, permit conditions, or any other concern that would result from issuance of this permit.

The Department will consider all comments received within 30 days from the date of public notice of draft indicated above, in formulating a final determination to issue, revise, or deny the permit. The Department's response to all significant comments is available upon request and will be mailed directly to people expressing an interest in this permit.

Further information may be obtained from the Department by telephone, 509/457-7105, or by writing to the address listed above.

This permit and fact sheet was prepared by Jim Leier.

## APPENDIX B -- GLOSSARY

**Acute Toxicity**--The lethal effect of a pollutant on an organism that occurs within a short period of time, usually 48 to 96 hours.

**AKART**-- An acronym for “all known, available, and reasonable methods of prevention, control, and treatment”.

**Ambient Water Quality**--The existing environmental condition of the water in a receiving water body.

**Ammonia**--Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

**Average Monthly Discharge Limitation** --The highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month (except in the case of fecal coliform). The daily discharge is calculated as the average measurement of the pollutant over the day.

**Average Weekly Discharge Limitation** -- The highest allowable average of daily discharges over a calendar week, calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week. The daily discharge is calculated as the average measurement of the pollutant over the day.

**Best Management Practices (BMPs)**--Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the State. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

**BOD<sub>5</sub>**--Determining the Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD<sub>5</sub> is used in modeling to measure the reduction of dissolved oxygen in a receiving water after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD is not a specific compound, it is defined as a conventional pollutant under the Federal Clean Water Act.

**Bypass**--The intentional diversion of waste streams from any portion of a treatment facility.

**CBOD5** – The quantity of oxygen utilized by a mixed population of microorganisms acting on the nutrients in the sample in an aerobic oxidation for five days at a controlled temperature of 20 degrees Celsius, with an inhibitory agent added to prevent the oxidation of nitrogen compounds. The method for determining CBOD5 is given in 40 CFR Part 136.

**Chlorine**--Chlorine is used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

**Chronic Toxicity**--The effect of a pollutant on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

**Clean Water Act (CWA)**--The Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

**Combined Sewer Overflow (CSO)**--The event during which excess combined sewage flow caused by inflow is discharged from a combined sewer, rather than conveyed to the sewage treatment plant because either the capacity of the treatment plant or the combined sewer is exceeded.

**Compliance Inspection - Without Sampling**--A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

**Compliance Inspection - With Sampling**--A site visit to accomplish the purpose of a Compliance Inspection - Without Sampling and as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the percent removal requirement. Additional sampling may be conducted.

**Composite Sample**--A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing a minimum of four discrete samples. May be "time-composite"(collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots.

**Construction Activity**--Clearing, grading, excavation and any other activity which disturbs the surface of the land. Such activities may include road building, construction of residential houses, office buildings, or industrial buildings, and demolition activity.

**Continuous Monitoring** –Uninterrupted, unless otherwise noted in the permit.

**Critical Condition**--The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

**Dilution Factor**--A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the effluent fraction e.g., a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

**Engineering Report**--A document which thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report shall contain the appropriate information required in WAC 173-240-060 or 173-240-130.

**Fecal Coliform Bacteria**--Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

**Grab Sample**--A single sample or measurement taken at a specific time or over as short period of time as is feasible.

**Industrial User**-- A discharger of wastewater to the sanitary sewer which is not sanitary wastewater or is not equivalent to sanitary wastewater in character.

**Industrial Wastewater**--Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business, from the development of any natural resource, or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and, also, leachate from solid waste facilities.

**Infiltration and Inflow (I/I)**--"Infiltration" means the addition of ground water into a sewer through joints, the sewer pipe material, cracks, and other defects. "Inflow" means the addition of precipitation-caused drainage from roof drains, yard drains, basement drains, street catch basins, etc., into a sewer.

**Interference** -- A discharge which, alone or in conjunction with a discharge or discharges from other sources, both:

Inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal and;

Therefore is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent State or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) (including title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA), and including State regulations contained in any State sludge management plan prepared pursuant to subtitle D of the SWDA), sludge regulations appearing in 40 CFR Part 507, the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act.

**Major Facility**--A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

**Maximum Daily Discharge Limitation**--The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

**Method Detection Level (MDL)**--The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is above zero and is determined from analysis of a sample in a given matrix containing the analyte.

**Minor Facility**--A facility discharging to surface water with an EPA rating score of < 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

**Mixing Zone**--A volume that surrounds an effluent discharge within which water quality criteria may be exceeded. The area of the authorized mixing zone is specified in a facility's permit and follows procedures outlined in State regulations (Chapter 173-201A WAC).

**National Pollutant Discharge Elimination System (NPDES)**--The NPDES (Section 402 of the Clean Water Act) is the Federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the State of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both State and Federal laws.

**Pass through** -- A discharge which exits the POTW into waters of the-State in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation), or which is a cause of a violation of State water quality standards.



**pH**--The pH of a liquid measures its acidity or alkalinity. A pH of 7 is defined as neutral, and large variations above or below this value are considered harmful to most aquatic life.

**Potential Significant Industrial User**--A potential significant industrial user is defined as an Industrial User which does not meet the criteria for a Significant Industrial User, but which discharges wastewater meeting one or more of the following criteria:

- a. Exceeds 0.5 % of treatment plant design capacity criteria and discharges <25,000 gallons per day or;
- b. Is a member of a group of similar industrial users which, taken together, have the potential to cause pass through or interference at the POTW (e.g. facilities which develop photographic film or paper, and car washes).

The Department may determine that a discharger initially classified as a potential significant industrial user should be managed as a significant industrial user.

**Quantitation Level (QL)**-- A calculated value five times the MDL (method detection level).

**Significant Industrial User (SIU)**--

- 1) All industrial users subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N and;
- 2) Any other industrial user that: discharges an average of 25,000 gallons per day or more of process wastewater to the POTW (excluding sanitary, noncontact cooling, and boiler blow-down wastewater); contributes a process wastestream that makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the Control Authority\* on the basis that the industrial user has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement (in accordance with 40 CFR 403.8(f)(6)).

Upon finding that the industrial user meeting the criteria in paragraph 2, above, has no reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement, the Control Authority\* may at any time, on its own initiative or in response to a petition received from an industrial user or POTW, and in accordance with 40 CFR 403.8(f)(6), determine that such industrial user is not a significant industrial user.

\*The term "Control Authority" refers to the Washington State Department of Ecology in the case of non-delegated POTWs or to the POTW in the case of delegated POTWs.

**State Waters**--Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, wetlands, and all other surface waters and watercourses within the jurisdiction of the State of Washington.

**Stormwater**--That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility.

**Technology-based Effluent Limit**--A permit limit that is based on the ability of a treatment method to reduce the pollutant.

**Total Suspended Solids (TSS)**--Total suspended solids are the particulate materials in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

**Upset**--An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

**Water Quality-based Effluent Limit**--A limit on the concentration or mass of an effluent parameter that is intended to prevent the concentration of that parameter from exceeding its water quality criterion after it is discharged into a receiving water.

## APPENDIX C -- TECHNICAL CALCULATIONS

Several of the Excel® spreadsheet tools used to evaluate a discharger's ability to meet Washington State water quality standards can be found on the Department's homepage at <http://www.ecy.wa.gov/programs/wq/wastewater/index.html>

AQUATIC LIFE REASONABLE POTENTIAL DETERMINATION FOR --- Douglas County Sewer District - East Wenatchee STP 2004																	
				State Water Quality Standard		Max concentration at edge of...											
	Metal Criteria Translator as decimal	Metal Criteria Translator as decimal	Ambient Concentration (metals as dissolved) ug/L	Acute ug/L	Chronic ug/L	Acute Mixing Zone ug/L	Chronic Mixing Zone ug/L	LIMIT REQ'D?	Effluent percentile value		Max effluent conc. measured (metals as total recoverable) ug/L	Coeff Variation CV	s	# of samples n	Multiplier	Acute Dil'n Factor	Chronic Dil'n Factor
Parameter	Acute	Chronic								P <sub>n</sub>							
ZINC- 7440666 13M hardness dependent	0.996	0.996	4.00	79.45	72.55	17.13	5.79	NO	0.95	0.224	65.00	0.60	0.55	2	3.79	18.4	135
COPPER - 744058 6M Hardness dependent	0.996	0.996	2.00	11.34	7.86	6.41	2.60	NO	0.95	0.224	22.00	0.60	0.55	2	3.79	18.4	135
LEAD - 7439921 7M Dependent on hardness	0.466	0.466	0.17	40.28	1.57	0.32	0.19	NO	0.95	0.050	1.00	0.60	0.55	1	6.2	18.4	135
IRON 7439896	NA	NA	1.00	NA	1000	NA	3.55	NO	0.95	0.05	55.80	0.6	0.55	1	6.2	18.40	135.00
ALUMINUM, total recoverable, pH 6.5-9.0 7429905	NA	NA	28.00	750.0	NA	45.98	NA	NO	0.95	0.050	57.90	0.60	0.55	1	6.2	18.4	135
AMMONIA (ambient water temp. 19° C; pH - 8.0)	NA	NA	40.00	5597.0	967.8	1686.51	264.41	NO	0.95	0.948	30000	0.60	0.55	56	1.01	18.4	135
CYANIDE 57125 14M	NA	NA	0.01	22.00	5.20	5.269	0.727	NO	0.95	0.224	25.5	0.60	0.55	2	3.79	18.4	135

Water Quality Reasonable Potential for Protection of Human Health --- DCSD- East Wenatchee STP 2004																
Parameter	Ambient Concentration (Geometric Mean) ug/L	Water Quality Criteria for Protection of Human Health ug/L	Max concentration at edge of chronic mixing zone. ug/L	LIMIT REQ'D?	Expected Number of Compliance Samples per Month	AVERAGE MONTHLY EFFLUENT LIMIT ug/L	MAXIMUM DAILY EFFLUENT LIMIT ug/L	Estimated Percentile at 95% Confidence	Pn	Max effluent conc. measured ug/L	Coeff Variation CV	S	# of samples from which # in col. K was taken n	Multiplier	Calculated 50th percentile Effluent Conc. (When n>10)	Dilution Factor
IRON 7439896 ( USGS ambient data from Vernita Bridge)	15.0000	300.00	15.92	NO	0.02	NONE	NONE	0.50	0.05	55.80	0.60	0.6	1	2.49		135.0
CYANIDE 57125 14M	10.0000	700.00	11.54	NO	0.09	NONE	NONE	0.50	0.05	87.50	0.60	0.6	1	2.49		135.0

**APPENDIX C -- TECHNICAL CALCULATIONS (continued)**

Calculation of pH of a mixture of two flows. Based on the procedure in EPA's DESCON program (EPA, 1988. Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling. USEPA Office of Water, Washington D.C.)

Based on Lotus File PHMIX2.WK1 Revised 19-Oct-93

INPUT	
1. DILUTION FACTOR AT MIXING ZONE BOUNDARY	135.000
1. UPSTREAM/BACKGROUND CHARACTERISTICS	
Temperature (deg C):	19.00
pH:	8.00
Alkalinity (mg CaCO3/L):	65.00
2. EFFLUENT CHARACTERISTICS	
Temperature (deg C):	25.00
pH:	7.60
Alkalinity (mg CaCO3/L):	163.00
OUTPUT	
1. IONIZATION CONSTANTS	
Upstream/Background pKa:	6.39
Effluent pKa:	6.35
2. IONIZATION FRACTIONS	
Upstream/Background Ionization Fraction:	0.98
Effluent Ionization Fraction:	0.95
3. TOTAL INORGANIC CARBON	
Upstream/Background Total Inorganic Carbon (mg CaCO3/L):	66.59
Effluent Total Inorganic Carbon (mg CaCO3/L):	172.17
4. CONDITIONS AT MIXING ZONE BOUNDARY	
Temperature (deg C):	19.04
Alkalinity (mg CaCO3/L):	65.73
Total Inorganic Carbon (mg CaCO3/L):	67.37
pKa:	6.39
pH at Mixing Zone Boundary:	7.99

**APPENDIX D -- ADDITIONAL CHEMICAL ANALYSIS OF EFFLUENT**

Priority Pollutant Parameter	Units	Average Value	Number of Samples	Number of Detects
<b>Metals and Total Phenols</b>				
Antimony	µg/L	ND <sup>a</sup>	2	0
Arsenic	µg/L	ND	2	0
Beryllium	µg/L	ND	2	0
Cadmium	µg/L	ND	2	0
Chromium	µg/L	ND	2	0
Mercury	µg/L	ND	2	0
Molybdenum	µg/L	ND	2	0
Nickel	µg/L	ND	2	0
Selenium	µg/L	ND	2	0
Silver	µg/L	ND	2	0
Thallium	µg/L	ND	2	0
Total Phenols	µg/L	ND	2	0
<b>Volatile Organics by USEPA Method 624</b>				
Chloromethane	µg/L	ND	2	0
Vinyl chloride	µg/L	ND	2	0
Bromomethane	µg/L	ND	2	0
Chloroethane	µg/L	ND	2	0
Trichlorofluoromethane	µg/L	ND	2	0
1,1-Dichloroethene	µg/L	ND	2	0
Methylene chloride	µg/L	ND	2	0
trans- 1,2-Dichloroethene	µg/L	ND	2	0
1,1-Dichloroethane	µg/L	ND	2	0
Chloroform	µg/L	ND	2	0
1,1,1-Trichloroethane	µg/L	ND	2	0
Carbon Tetrachloride	µg/L	ND	2	0
Benzene	µg/L	ND	2	0
1,2-Dichloroethane	µg/L	ND	2	0
Trichloroethene	µg/L	ND	2	0
1,2-Dichloropropane	µg/L	ND	2	0
Bromodichloromethane	µg/L	ND	2	0
2-Chloroethyl vinyl ether	µg/L	ND	2	0
cis-1,3-Dichloropropene	µg/L	ND	2	0
Toluene	µg/L	ND	2	0
trans-1,3-Dichloropropene	µg/L	ND	2	0
1,1,2-Trichloroethane	µg/L	ND	2	0

Priority Pollutant Parameter	Units	Average Value	Number of Samples	Number of Detects
Tetrachloroethene	µg/L	ND	2	0
Dibromochloromethane	µg/L	ND	2	0
Chlorobenzene	µg/L	ND	2	0
Ethylbenzene	µg/L	ND	2	0
Bromoform	µg/L	ND	2	0
1,1,2,2-Tetrachloroethane	µg/L	ND	2	0
1,3-Dichlorobenzene	µg/L	ND	2	0
1,4-Dichlorobenzene	µg/L	ND	2	0
1,2-Dibromo-3-chloropropane	µg/L	ND	2	0
<b>Semi-Volatile Organics by USEPA Method 625</b>				
Phenol	µg/L	ND	2	0
bis(2-Chloroethyl)ether	µg/L	ND	2	0
2-Chlorophenol	µg/L	ND	2	0
1,3-Dichlorobenzene	µg/L	ND	2	0
1,4-Dichlorobenzene	µg/L	ND	2	0
1,2-Dichlorobenzene	µg/L	ND	2	0
bis(2-Chloroisopropyl) ether	µg/L	ND	2	0
N-nitroso-di-n-propylamine	µg/L	ND	2	0
Hexachloroethane	µg/L	ND	2	0
Nitrobenzene	µg/L	ND	2	0
Isophorone	µg/L	ND	2	0
2-Nitrophenol	µg/L	ND	2	0
2,4-Dimethylphenol	µg/L	ND	2	0
bis(2-Chloroethoxy) methane	µg/L	ND	2	0
2,4-Dichlorophenol	µg/L	ND	2	0
1,2,4-Trichlorobenzene	µg/L	ND	2	0
Naphthalene	µg/L	ND	2	0
Hexachlorobutadiene	µg/L	ND	2	0
4-Chloro-3-methylphenol	µg/L	ND	2	0
Hexachlorocyclopentadiene	µg/L	ND	2	0
2,4,6-Trichlorophenol	µg/L	ND	2	0
2,4,5-Trichlorophenol	µg/L	ND	2	0
2-Chloronaphthalene	µg/L	ND	2	0
Dimethylphthalate	µg/L	ND	2	0
Acenaphthylene	µg/L	ND	2	0
2,6-Dinitrotoluene	µg/L	ND	2	0
Acenaphthene	µg/L	ND	2	0

Priority Pollutant Parameter	Units	Average Value	Number of Samples	Number of Detects
2,4-Dinitrophenol	µg/L	ND	2	0
4-Nitrophenol	µg/L	ND	2	0
Dibenzofuran	µg/L	ND	2	0
2,4-Dinitrotoluene	µg/L	ND	2	0
Diethylphthalate	µg/L	ND	2	0
4-Chlorophenylphenylether	µg/L	ND	2	0
Fluorene	µg/L	ND	2	0
4,6-Dinitro-2-methylphenol	µg/L	ND	2	0
N-Nitrosodiphenylamine	µg/L	ND	2	0
4-Bromophenylphenylether	µg/L	ND	2	0
Hexachlorobenzene	µg/L	ND	2	0
Pentachlorophenol	µg/L	ND	2	0
Phenanthrene	µg/L	ND	2	0
Anthracene	µg/L	ND	2	0
Di-n-butylphthalate	µg/L	ND	2	0
Fluoranthene	µg/L	ND	2	0
Pyrene	µg/L	ND	2	0
Butylbenzylphthalate	µg/L	ND	2	0
3,3'-Dichlorobenzidine	µg/L	ND	2	0
Benzo(a)anthracene	µg/L	ND	2	0
Chrysene	µg/L	ND	2	0
bis(2-ethylhexyl)phthalate	µg/L	ND	2	0
Di-n-octylphthalate	µg/L	ND	2	0
Benzo(a)fluoranthene	µg/L	ND	2	0
Benzo(a)pyrene	µg/L	ND	2	0
Indeno(1,2,3-cd)pyrene	µg/L	ND	2	0
Dibenz(a,h)anthracene	µg/L	ND	2	0
Benzo(g,h,i)perylene	µg/L	ND	2	0
Carbazole	µg/L	ND	2	0
N-nitrosodimethylamine	µg/L	ND	2	0
Benzdine	µg/L	ND	2	0
Azobenzene	µg/L	ND	2	0
<sup>a</sup> ND-Not detected				

**APPENDIX E -- RESPONSE TO COMMENTS**

No comments were received by the Department of Ecology.